Hedonistic Sustainability: Sustainability without Compromise

An Honors Thesis (ARCH 402)

by

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Abstract

My focus in studying hedonistic sustainability is to examine the user's enjoyment and experience and identify where this can intersect and benefit environmental sustainability. Sustainability only works if it does not compromise the lifestyle of the individual. If the individual is asked to give up amenities to contribute to a more sustainable environment, then the idea is not likely to be successful. This thesis is an exploration of sustainability that looks beyond just building performance to focus also on the social and cultural aspects of creating a healthy environment for residents. This project focuses on access to outdoor or park space and how this makes people happier and healthier in their mental or social states, as green spaces have been linked to better mental health (Gaston, 2015, p. 4355). I successfully experimented with non-rectilinear forms to increase the amount of light and access to views, and to create interesting and vibrant spaces for inhabitants while still maintaining a consistent floorplate efficiency required by the developer.

Acknowledgments

First, I would like to thank Prof. Dan Woodfin for advising me through this project, and throughout my education at Ball State University. Without his help and guidance I would not be where I am today.

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And lastly, I would like to thank my parents, Brian and Lisa Goodman, for their unwavering support of my education.

Process Analysis Statement

A lot goes into an architectural project of this scope. This project, a series of residential high-rise towers located on Halsted point, encompasses 1.6 million square feet of programmed area, a daunting amount to try and cover in the course of a semester. Countless hours were spent analyzing the site, dissecting the problem statement, and extensively researching housing precedents before a preliminary design was ever conceived. After the design conception, this project passed through five design critiques before it reached the stage it is today. On the surface it might seem like the preliminary designs for this project look nothing like the final, yet, there was something to be learned from and expanded on in each design. With each design pass, using advice received in each of the project critiques, this design was refined to become better and better.

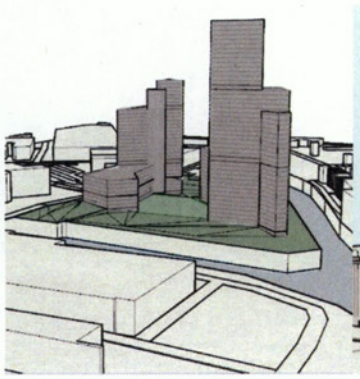

Figure 1

Figure 2

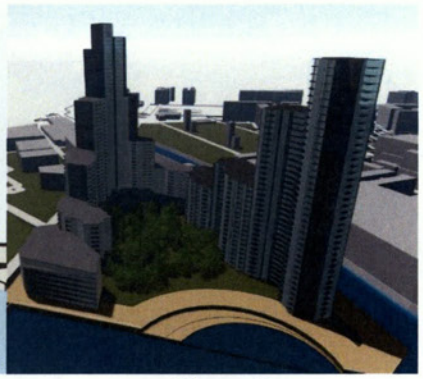

Figure 3

The first pass (figure 1) was a study in basic form. The second pass (figure 2), a study in maximizing views. The third pass (figure 3), was an exploration in apartment unit typology and it was the last exploration before I finalized the final project design. While none of these are the final, I learned a lot from each exploration.

1. In the first pass, the successes and failures of this design pushed me to explore the micro scale, and let that inform the macro scale and overall form of the project.
2. The second pass showed me the need for standardization that could be repeated in the ideas that I was exploring.
3. In the third pass, I created the building blocks that would define the rest of the project and I discovered that I needed a better configuration of those blocks.

Each iteration was built on the successes and failures of the previous versions, and each helped evolve the project that was the synthesis of all that I have discovered and learned.

Introduction

For this thesis, I have explored sustainable design through the principles of hedonistic sustainability. This term was coined by architect Bjarke Ingels, and it is defined as "sustainability that improves quality of life and human enjoyment." It rejects the idea that sustainability requires sacrifices, whether in cost or activities (Ingels, 2011). Ingels and other proponents of hedonistic sustainability also argue that sustainable practices are not successful if they only consider environmental concerns. For sustainability to be "sustainable," it must work in all aspects: financially, environmentally, and socially. This thesis project is a creative exploration of the application of hedonistic sustainability. This project was a design for a site being developed in Chicago. The site lies on Goose Island (see figure 4), a man-made island that previously supported manufacturing and industry.

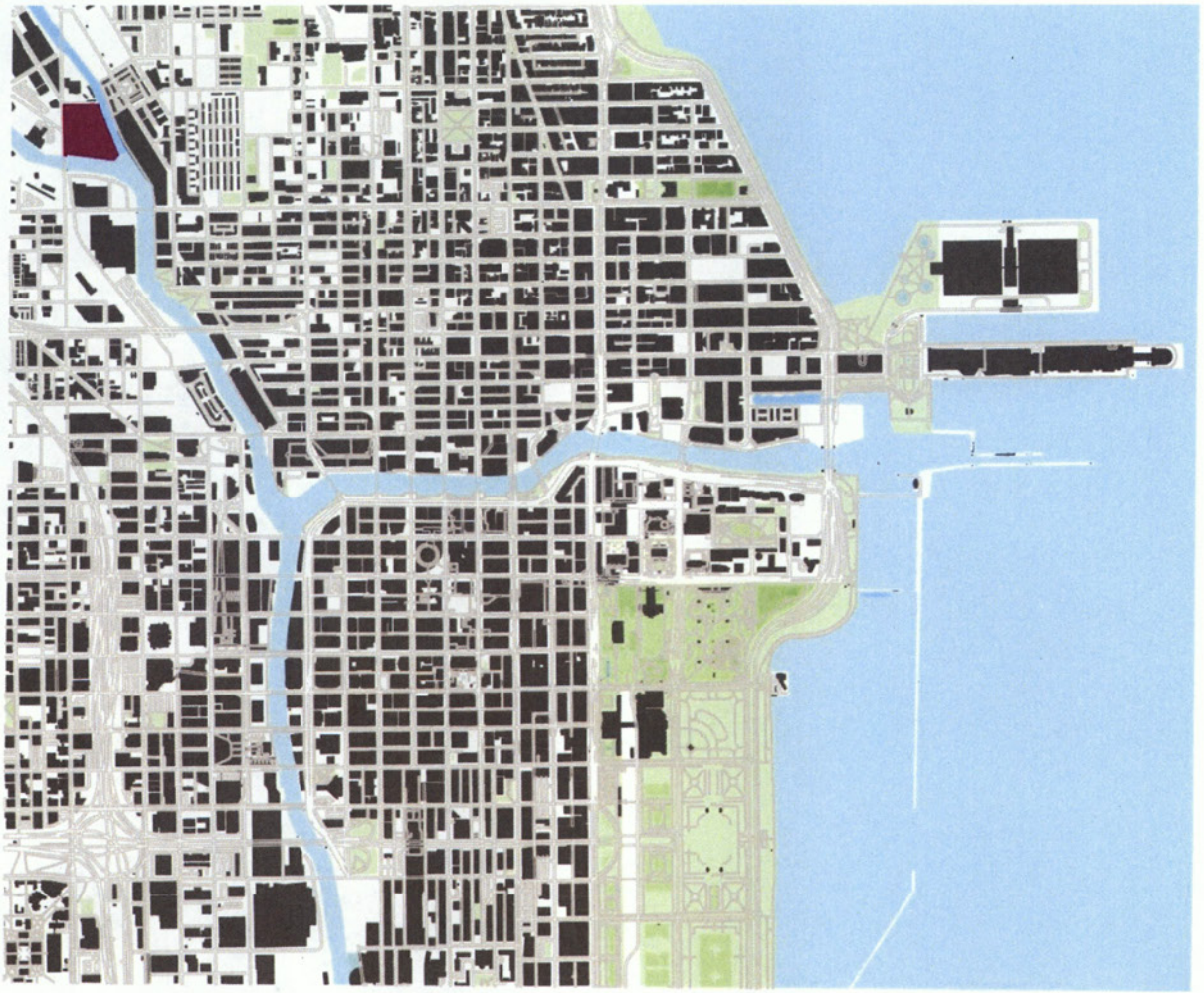

Figure 4: Site on Goose Island (magenta) in the context of the larger Chicago area. Site is bordered by Halsted Street on the west, and the Chicago River on the east and south.

The site is currently being rezoned to accommodate mixed-use residential applications. It is across the river from the city's proposal to Amazon as the site for a

new headquarters campus. The City of Chicago has envisioned Goose Island to be the heart of a new technology sector in Chicago. My exploration in particular focuses in on Halsted Point, the southernmost part of the island, and seeks to create a residential community that will serve the commercial and industrial uses existing and projected for that area. The program of this project includes 30,000 square feet of retail space, 120,000 square feet of office space, 1.3 million square feet of residential space, parking proportional to these uses, and extensive riverfront development. The goal of this creative project is to cohesively merge the commercial and residential needs of the site with ideas of hedonistic sustainability to create a development that enhances the quality of life, health, and well-being of the residents in this new neighborhood as well as their neighbors or visitors to this part of the city.

Overview of Hedonistic Sustainability

Before a project can be successful on an environmental level, it has to work on a social level. In an interview with the American Society of Landscape Architects, Bjarke Ingels, founder of the hedonistic sustainability movement, stated:

> We shouldn't forget what we are here to do in the first place as architects and landscape architects. It's to improve the quality of life for everyone and not at the expense of the quality of life for other people or other life forms, for that matter. The whole discussion about sustainability isn't popular because it's always presented as a downgrade. The position has been there's a limit to how good a time we can have. We have to downgrade our current lifestyle to achieve something that is sustainable. That makes it essentially undesirable. People can be to the left and maybe shop a little bit green, but they're not going to drop their car if they have to pick up their kids from football and go to the movies. It becomes an impossible mission. (Green, 2011)

The purpose of hedonistic sustainability is not to change the lifestyle of the inhabitants, but to create a healthier living environment for all residents. Tara Mohhadi, a member of SCAPE, a New York based landscape architecture firm, explains: "the built environment, natural environment, and the population of the city are highly interconnected forces…green spaces, provide benefits ranging from impeding the urban heat island effect, storm water management, improving biodiversity, and even carbon sequestration. They provide mental and health benefits, and can increase property values. The ecological and anthropocentric benefits of green spaces are not mutually exclusive." She explains that successful projects are so due to their "holistic nature," offering benefits that "scale from individual mental health to community-wide public health and quality of life, while also contributing to the mitigation of climate change on both a local and global scale" (Mohtadi, 2016, p. 25). In other words, places that make people happy, make them desire to live there, thus driving up property values. This is a direct incentive for developers to focus on the end user—because if design is created

for people, the money will follow. Increased property values also provide the initial capital needed to install many "green" design components into the project, such as PV panels, geothermal heating and cooling systems, green roofs, etc. These elements can greatly improve a site's long-term environmental impact and performance, but often requires a larger upfront cost to install, which can make them unattractive to the developer. By increasing property values, a project can receive the capital needed to also be environmentally sustainable.

Creating a high-rise apartment based on hedonistic sustainability

To fully implement the principles of hedonistic sustainability within the design of a new apartment building, I began studying the design problem from the micro scale, starting with the apartment unit and working out towards the larger site design. I sought to reevaluate the apartment typology by redefining the apartment layout.

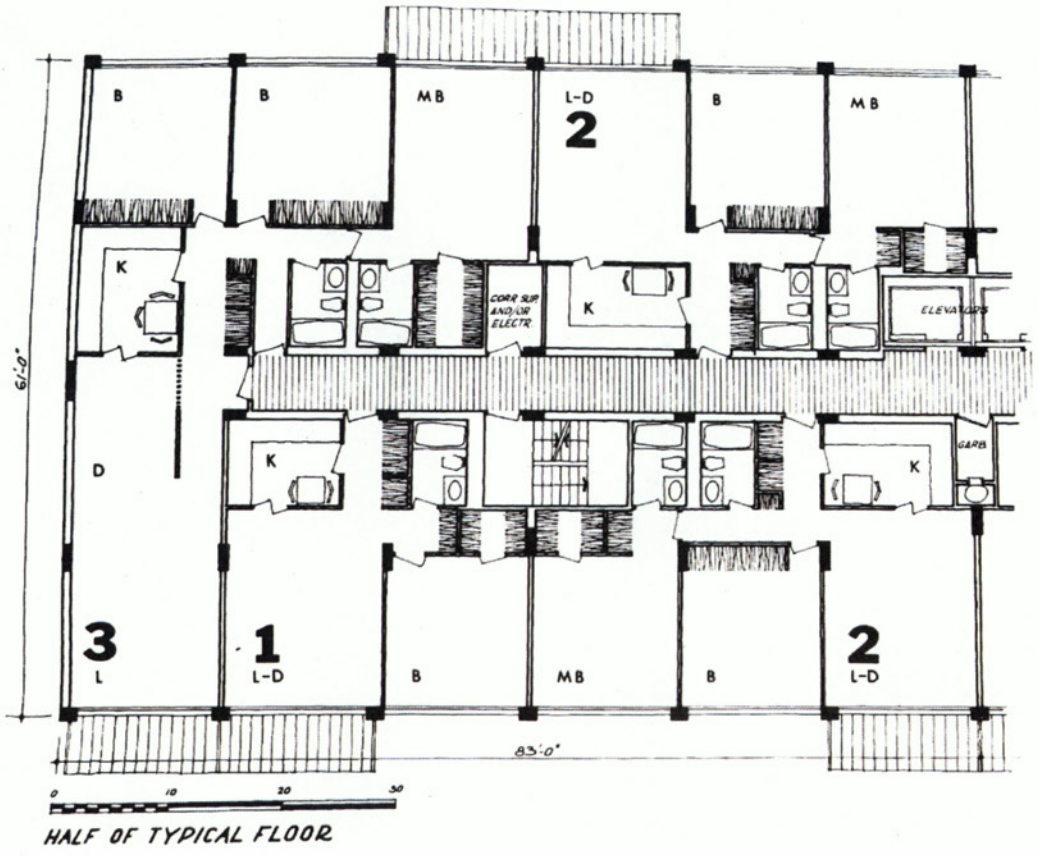

Figure 5: Image taken from Macsai's High Rise Apartment Buildings: A Design Primer, 1972, p. 80.

In the 1970's, Hungarian architect working in Chicago, John Macsai wrote and edited two design handbooks that defined the standards for housing and residential design: *High Rise Apartment Buildings* (1972) and *Housing* (1976), both outline how to

efficiently design residential housing in an urban setting. These books are still used today by firms as a guide in designing efficient high-rise housing. In studying these texts as a part of my coursework, I made several observations on the ideas outlined.

1. Macsai predominately worked with orthogonal forms and these orthogonal forms inherently create apartment units that are unequal in views afforded in a given direction. This can be seen in the image above (figure 5). Orthogonal plans, by their nature, only allow for a limited number of apartment units with exposure on more than one side of the building. In many plans, this means that only a maximum of four units out of the total on each floor could have exposure from multiple angles, and in the case in figure 5, one unit has exposure on three sides of the tower, while the other units only have one. This limits the potential views of the other units in the plan, and hence it limits the desirability of many apartments on each floor.
2. The advantage to the orthogonal plan is its high degree of efficiency. The orthogonal tower is created from the repetition of structural bays that lend the tower its efficiency and allow the design to be easily expanded to larger and larger floorplates.

My design study began by examining the principles that made the orthogonal plans that Macsai proposed successful, and I explored how those principles could be applied to a non- orthogonal design. I wanted to see how a non- orthogonal design could open up other design possibilities. With the orthogonal plan, façade exposure is directly related to the efficiency of the floorplate. How is this efficiency measured? The floorplate efficiency for a real estate developer is defined as the rentable area (i.e. the units themselves) as a percentage of the total floor area, which includes stairs, halls, lobbies, mechanical spaces, elevators, stairs, etc.

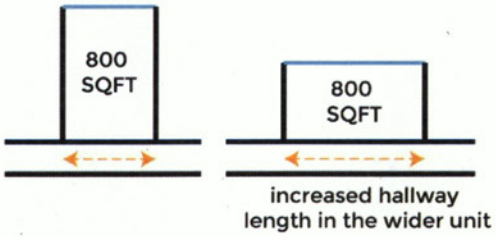

Figure 6

The problem with design for cost efficiency is that it typically produces narrow and deep apartments without good daylighting or little occupant connection to outdoors. To rectify this, apartment widths are increased, and the depth (to maintain a constant area) is decreased, and the hallway becomes longer (see figure 6). This increases the amount of non-rentable area in the floorplate (due to extra hall length) and this decreases the efficiency of the tower, making it less economical to build. However, the wider apartment has more access to natural daylighting, which saves on electric lighting needed, and also makes the units more pleasant places for tenants to live and is better

for their overall mental health (Mohtadi, 2016, 25). The wider unit is more sustainable when it comes to occupant welfare and energy loading on the building except when the wider units are improperly orientated leading to increased energy costs.

The dilemma is creating a more humane environment is more costly to the developer, who will see no a return on investment for the additional hallway area and increased exterior wall area. Even though the wider units might be better for the tenants, they will not be built because there is no monetary incentive for the developer to do so as the market is organized today.

My research addressed this dilemma by looking at how to satisfy both the developer and the resident. I felt the solution might be beyond the typical orthogonal designs. I experimented with a tapered apartment plan and found it increased the occupant's connection to the outdoors while maintaining the floorplate efficiency required by the developer (figure 7). This design maintains the economy of the design, and enhances the environmental quality for the occupants.

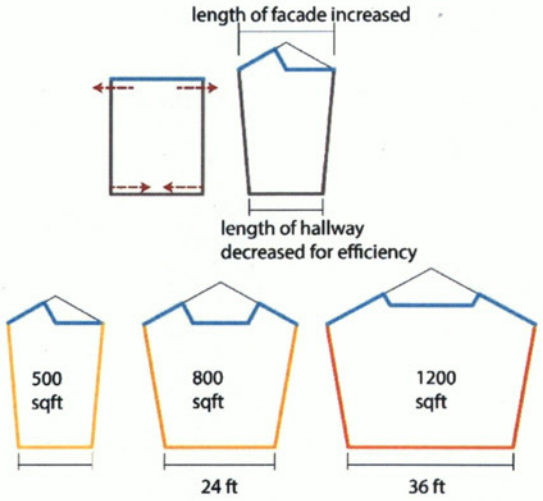

Figure 7: Diagram of tapered unit typology.

I developed a tapered-faceted edge unit typology for three different apartment types: a 500 square foot efficiency, an 800 square foot one-bedroom, and a 1200 square foot 2-bedroom unit. As part of my study, I conducted a daylight factor analysis using a program called Sefaira, and found that the tapered units received significantly more daylight, better distributed, than an orthogonal unit of the same hallway length.

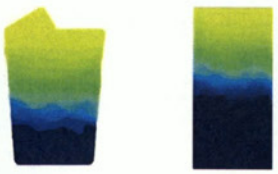

Figure 8: Greens represent daylight at sufficient levels to complete tasks, navy zones are areas without sufficient daylighting. These unit studies represent two apartments with the same hallway length.

Compositing the tapered apartments into arcs

Together, the tapered units form a convex unit on one side of the hallway and a concave unit on the other side. The convex and concave units (figure 9) are created by a radial structural grid. The concave unit was formed into a longer, thinner unit giving better daylight penetration where the form itself has a naturally restricting wall length. The concave unit is used for 2-3 bedroom units exclusively, which are well-suited to the long, thin nature of the concave unit. Because the floorplate depth of the concave unit is shallow, this unit type receives more than adequate daylighting over almost all of the unit as indicated by the daylight modeling tool.

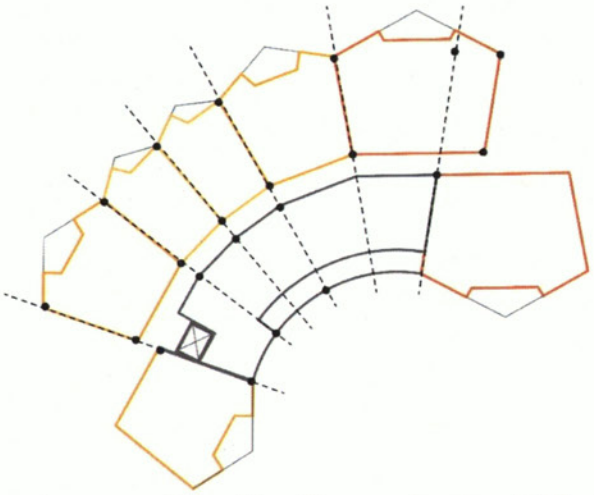

Figure 9: Concave and convex unit creation. They are developed differently as explained.

Corner unit advantages

In addition to the increased amount of daylighting, the tapered-faceted edge units each have the external characteristics of a corner unit, allowing for views in a variety of directions (see figure 10).

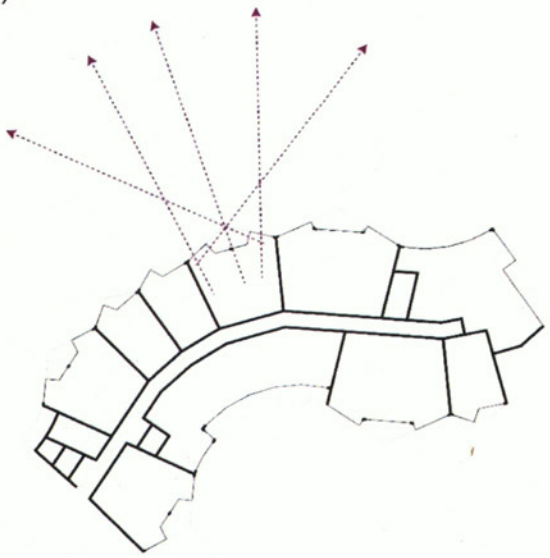

Figure 10: View diagram. Views taken perpendicular to exterior wall planes.

Where economics and humane design converge

The unit with many corner windows makes each unit more desirable. This design feature increases the quality of the space, makes the occupant happier and hence healthier, and increases the value of the unit for the developer's benefit. The developer sees a larger return on investment, making the project economically sound and desirable as an investment.

Figure 11: A view from a balcony.

Creating an Urban Fabric: Sociability of the Tower

In 2016, Studio Gang Architects in Chicago conducted a study, analyzing the tower typology in terms of its social connection to the city. Studio Gang reports that a strong sense of community "is especially important given the changing demographic of city dwellers. Millennials, the current generation moving to cities, are highly social and desire social opportunities" (Gang, 2016, p. 117). A strong sense of community, according to the National Council for Behavioral Health, can actually help residents led healthier lives by reducing stress, and increasing long term happiness (How, 2015). Balcony spaces provide views to neighboring landmarks, which fosters a resident's sense of neighborhood and community identity that is crucial for social connectivity (Gang, 2016, p. 118). The project's unique, faceted forms instills a strong sense of community identity through the unique, yet cohesive forms (figures 12, 13, 14).

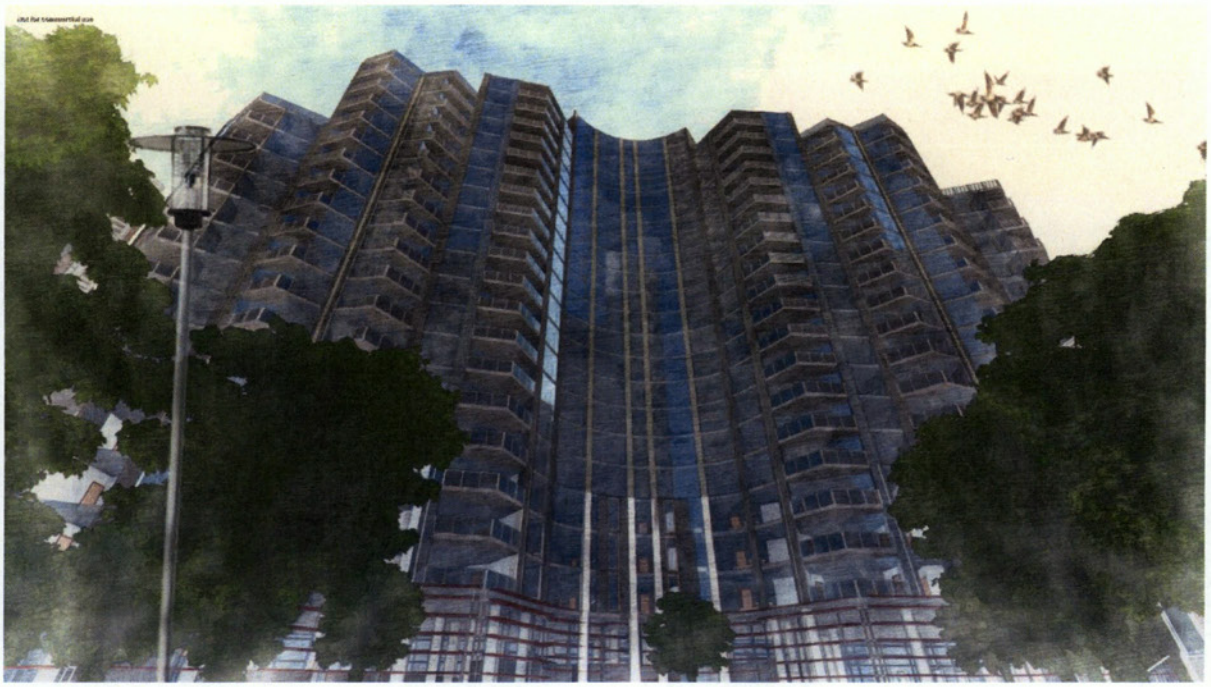

Figure 12: View of River Tower façade.

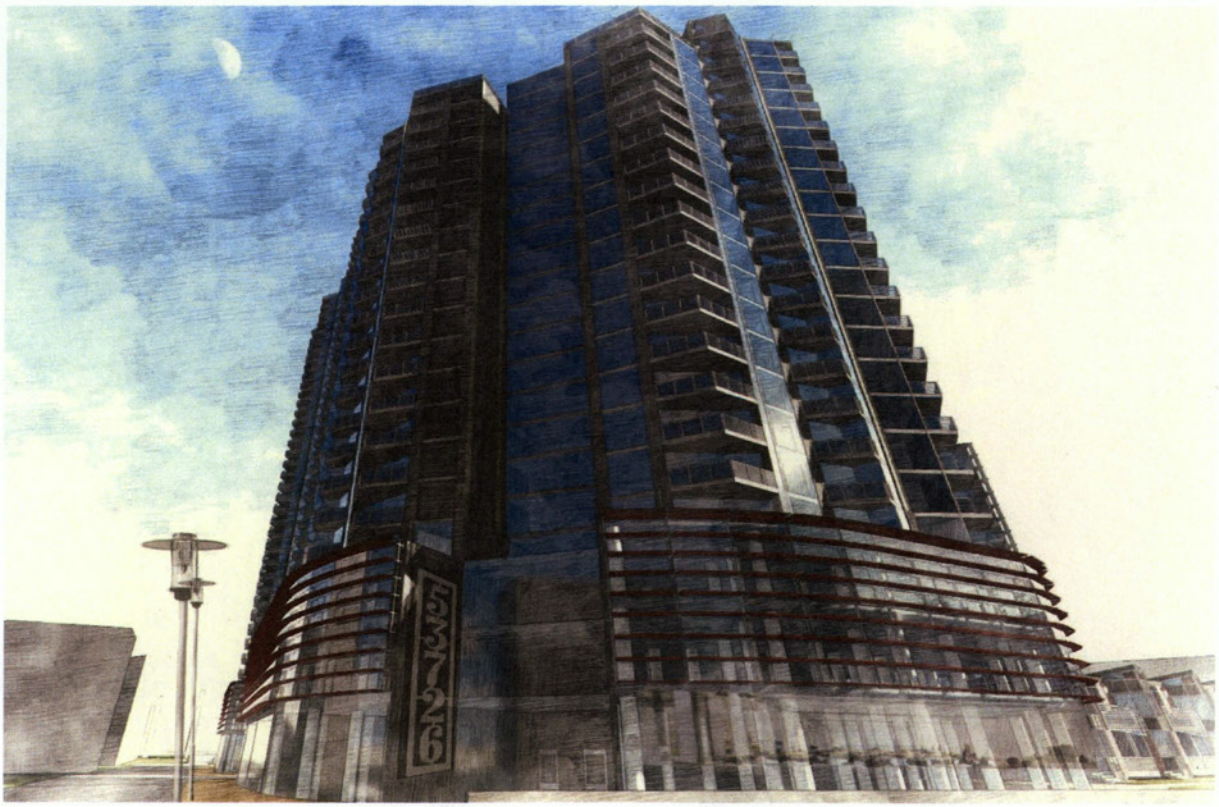

Figure 13: View of Halsted Tower 2 from the Halsted Street Bridge.

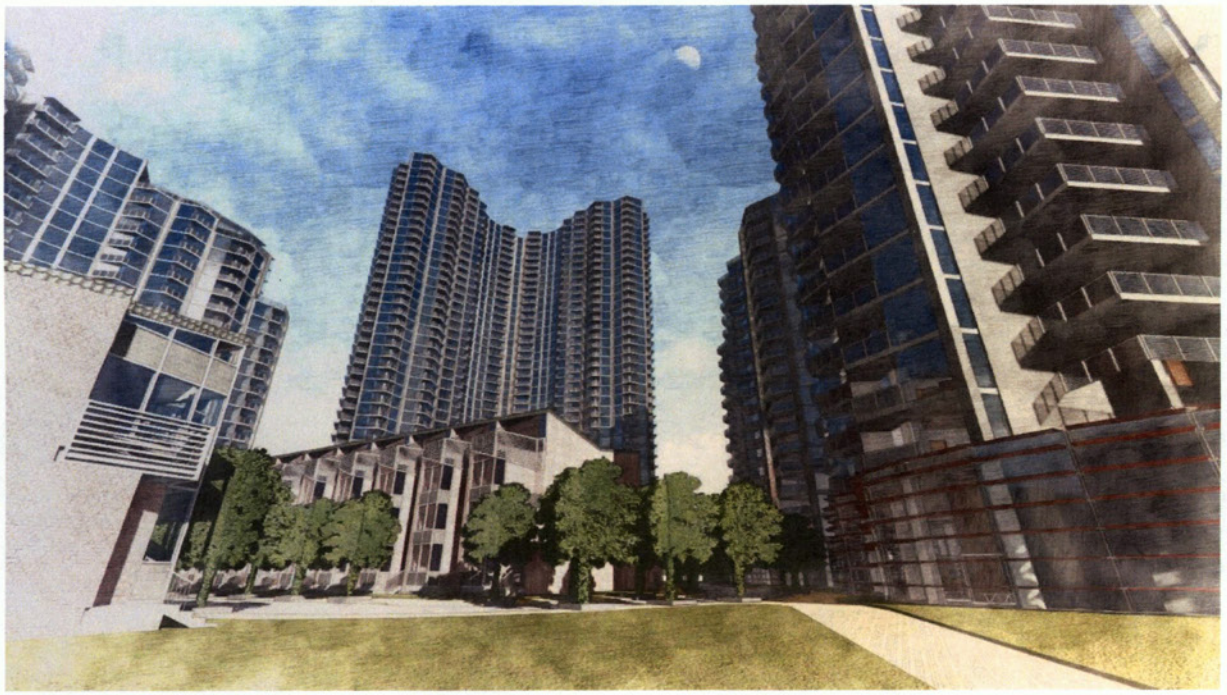

Figure 14: View of Halsted Tower 1 from Halsted Point with the River Tower on the right and Halsted Tower 2 on the left.

The sense of community of the site extends down into the center of the site with a series of townhouse units. These units create an urban feel to the site by creating a neighborhood fabric instead of just towers in a field (figures 15, 16).

Figure 15: View of townhouses with Halsted Tower 1 in the background.

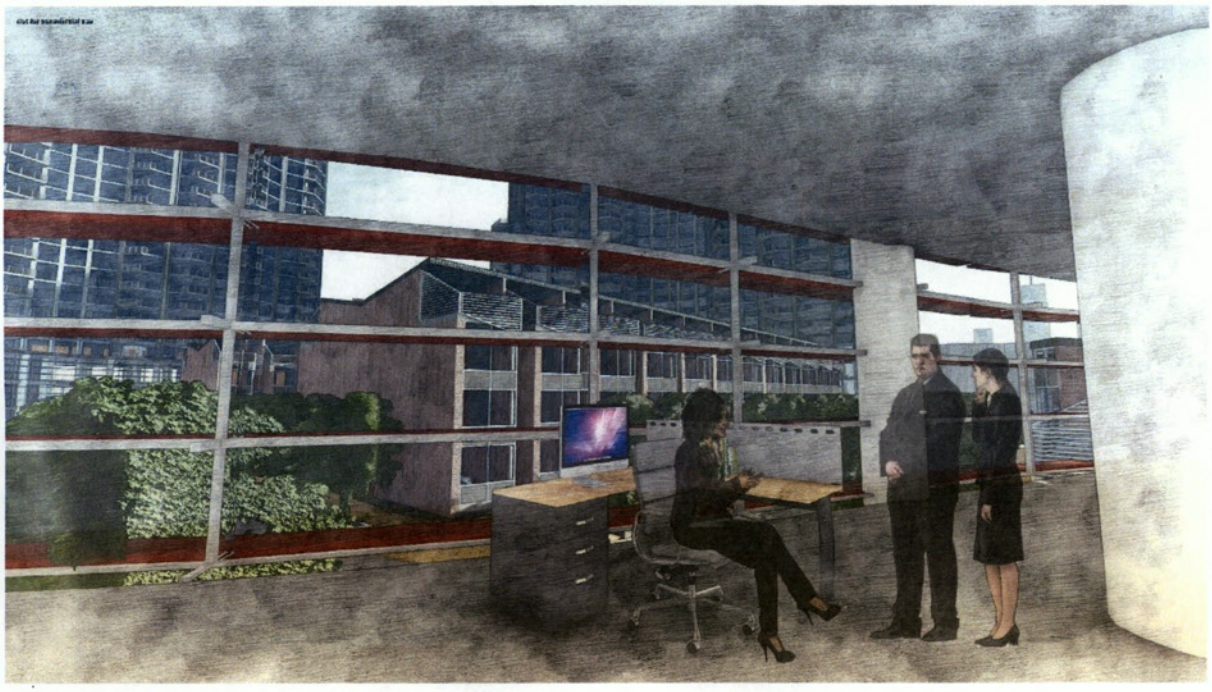

Figure 16: View from offices to townhouses.

The townhouses themselves also each feature balcony space to create opportunities for informal social interaction amongst neighbors. The balconies have a partial screening wall to keep a sense of privacy while still maintaining a visual connection (figures 17, 18).

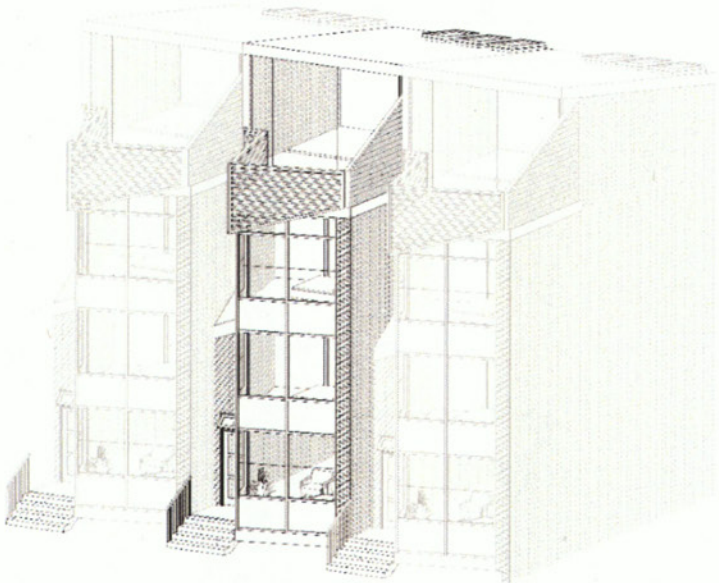

Figure 17: Balcony railing is built up between adjacent apartments to create a partial screening wall between units.

Figure 18: View of townhouse deck space; River Tower in the background.

A sense of community, however, fulfills more than just the need for interaction; it can actually make the development safer. When people care and feel a connection to their community, they take greater strides to take care of it. This is critical for creating defensible space, or the ability for residents to play an active role in their own security through principles such as being able to directly view street activity. Without a sense of community, residents do not put effort into taking care of their community. When people feel safe, they take care of their community to keep it that way, thus sustaining the community.

Figure 19: View from office deck onto roadway. River Tower is in the background, Halsted Tower 1 on the left side of the image.

Defensible space increases the likelihood that residents will see and report likely crimes, fostering positive social interaction among residents. Thus, collective responsibility deters and reduces crime and improve neighborhood quality of life" (p. 44). The townhouses provide what is known as "eyes on the street" for the interior roadways. The townhouses have a faceted façade with an L shaped corner window that juts out of the form, giving each room in the townhouse a view down the street as well as a view directly onto the street. (figures 19, 20, 21, 22).

Figure 20: First townhouse unit floorplans. L shaped corner window provides a view down the street on the short end of the L, while looking directly out to the front of the unit on the long side.

Figure 21: Second townhouse unit plans featuring two different apartment types. Again, each unit provides an L shaped window that offers two different views of the street.

Figure 22: View of townhouse units.

Figure 23: View along Halsted Street.

Figure 24: View into center of the site from Halsted Street.

Encouraging Healthy Living and Recreation

Keeping with the principles of hedonistic sustainability, the development does not seek to replace the car, rather, it simply provides means for other types of transportation and access. Car access is maintained, but it does not dominate the landscape. Roadways loop through the site, but the streets are narrow, encouraging drivers to slow down for the safety of pedestrians. All parking is subterranean, with the exception of a limited number of street parking spaces. Instead, the site is dominated with biking and walking paths. These paths connect to all nodes on the site, and encourage residents to spend time actively outside (figure 25).

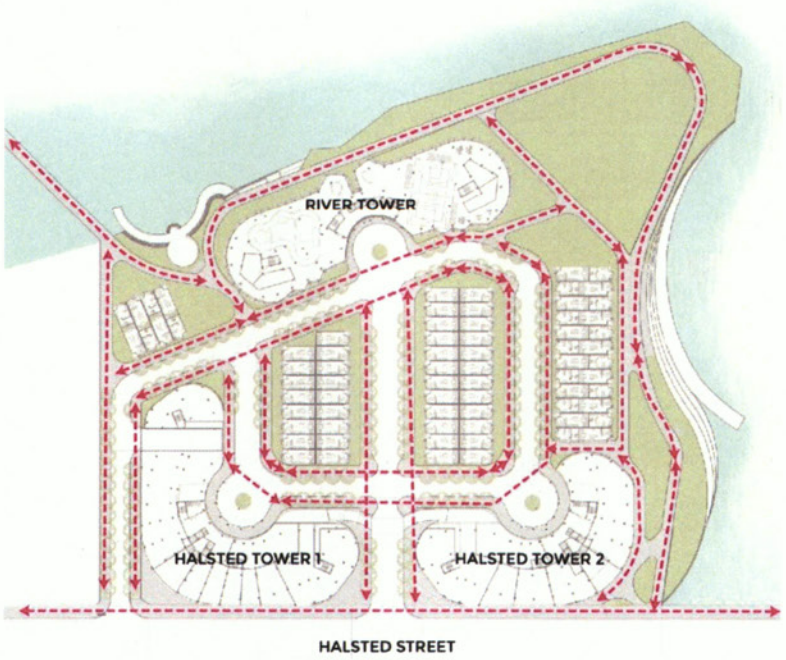

Figure 25: Diagram illustrating the biking and walking paths the cut throughout the site.

Extensive public park space along the river gives outdoor space back to the community. The architecture provides a buffer from the street, creating a safe space for children to play (figure 26). At several points, the Riverwalk cuts down closer to the water level to provide more intimate access to nature.

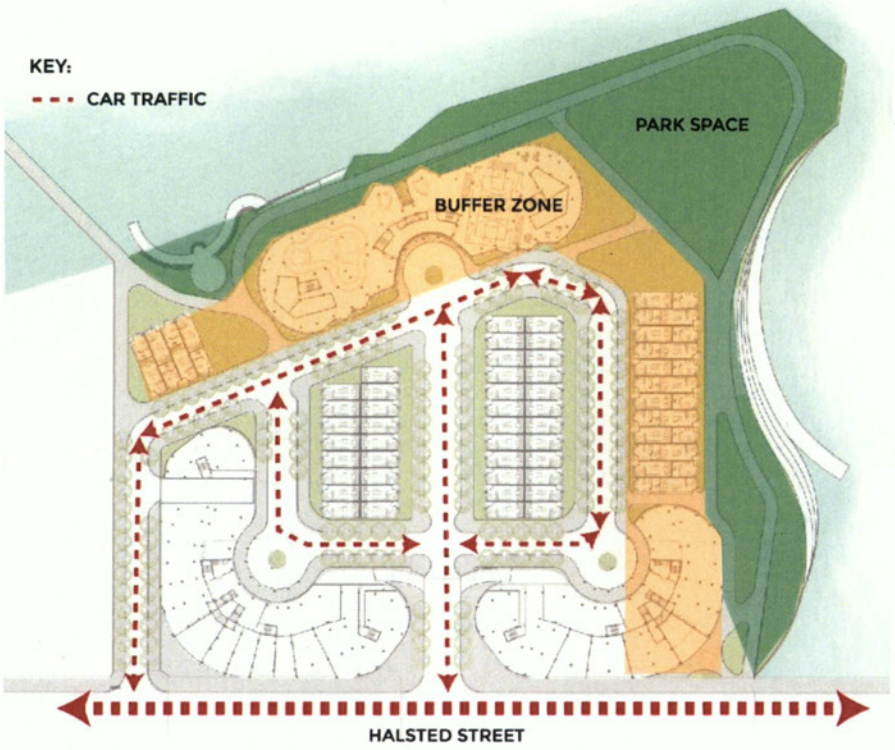

Figure 26: Public park space vs. car traffic.

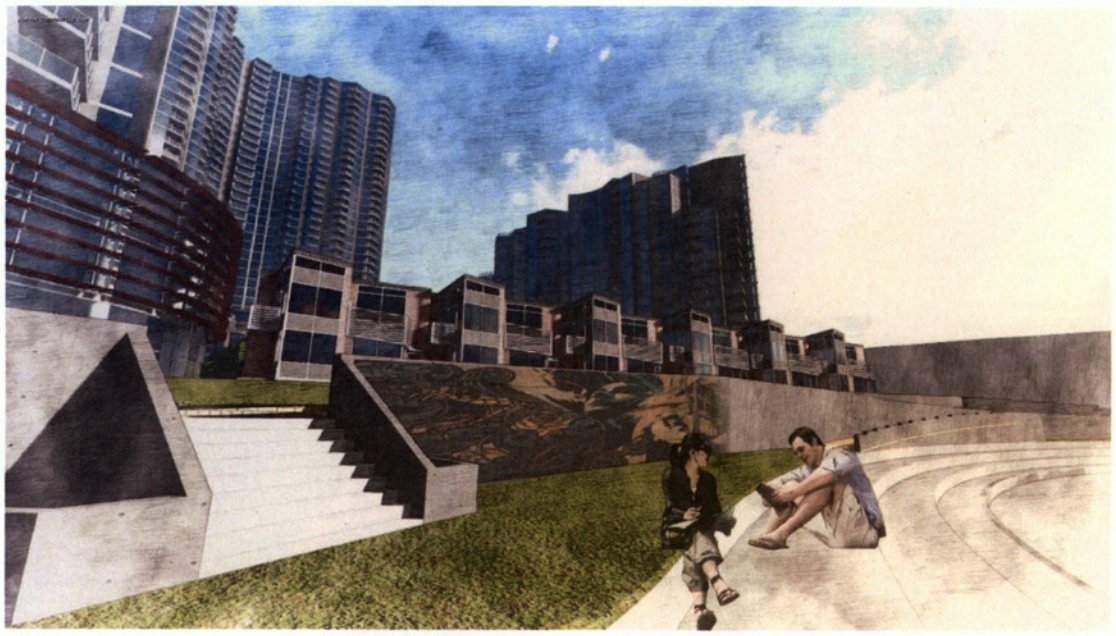

Figure 27: View of sunken portion of Riverwalk.

Conclusion: Opportunity for Environmental Sustainability

If people don't want to be here—if their needs and desires are not being met on a hedonistic level—then it doesn't matter how environmentally sustainable the project is, it simply will not sustain itself in the long term. In order for environmental sustainability principles to even be considered, the development has to make people happy and healthy, and the architecture has to be financially sound for the developer. This development, as shown in this project must provide for people and their quality life above all else. Once this need is met, then environmentally sustainable measures can be taken. In fact, hedonistic design already has environmentally sustainable measures built in. The park space that improves the health of the resident can act as storm water management and reduce the urban heat island effect. The balconies that create social connectivity within the site also shade the glazing below, to reduce solar heat gain in the summer, but are still shallow enough to allow in that solar gain in the winter to reduce the building heating loads. The street trees that help define the urban fabric, also work to reduce the urban heat island effect and create comfortable micro-climates for residents in the summer. These trees are deciduous, meaning that in the winter they will lose their leaves, allowing for more sunlight to enter the site in the cold months when it is needed, while still providing shade in the summer. With a sound foundation for hedonistic sustainability of the site, it is possible for developers to continue to improve the environment sustainability of the site because they have the economic foundation to do so.

Figure 28: Aerial View.

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